



# What are the most common mistakes made by exercise professionals working with pregnant clients?

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The nineteenth century recommendations was to avoid exercising during pregnancy to end it safely.



# ACOG COMMITTEE OPINION

Number 804

*(Replaces Committee Opinion Number 650, December 2015)*

## Committee on Obstetric Practice

*This Committee Opinion was developed by the Committee on Obstetric Practice with the assistance of committee members Meredith L. Birsner, MD; and Cynthia Gyamfi-Bannerman, MD, MSc.*

## Physical Activity and Exercise During Pregnancy and the Postpartum Period

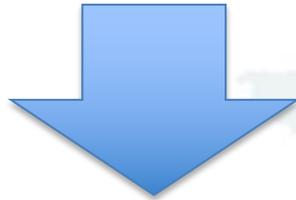
### Current approach:

In pregnancy, **physical inactivity** and excessive weight gain have been recognized as **independent risk factors** for maternal obesity and related pregnancy complications, including gestational diabetes mellitus (ACOG, 2020).

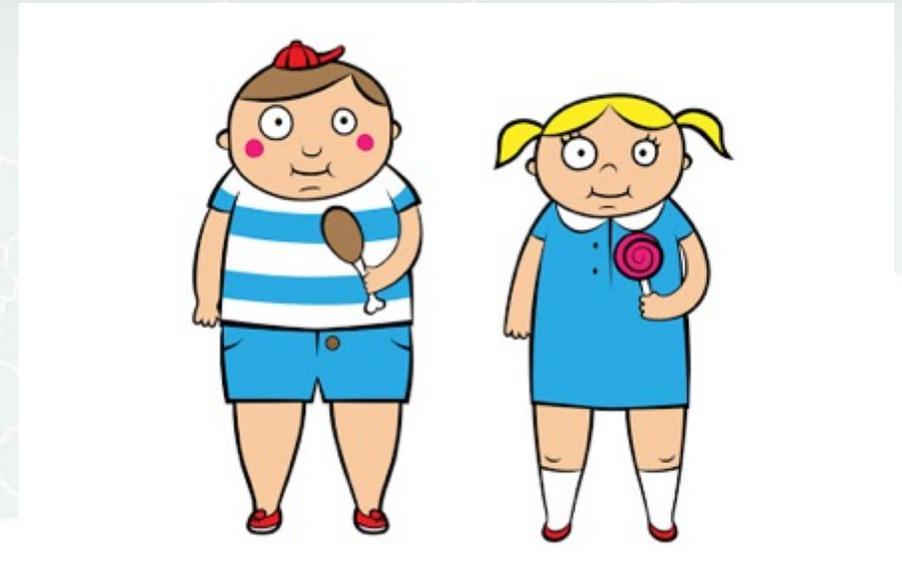
## Inactivity in pregnancy



**Obesity and metabolic disorders  
in children**



**Non-communicable diseases  
during and after pregnancy**



# Non-communicable diseases during pregnancy in low and middle income countries

Julia Hussein



**„Maternal health holds the key which could unlock the door, not only for the wellbeing of women today, but for future generations.” (Hussein, 2017)**

# Why do we have so many myths related to exercise in pregnancy?



# Myth # 1

## *Waiting to start physical activity until the end of the first trimester*



**Table 1. Cardiovascular Changes in a Normal Pregnancy\***

	First Trimester	Second Trimester	Third Trimester	Stage 1 Labor	Stage 2 Labor	Early Postpartum	3–6 months Postpartum
Cardiac Output	↑5–10%	↑↑35–45%		↑30%	↑↑50%	↑↑↑60–80% immediately, then rapidly decreases within the first hour	Return to pre-pregnancy values
Heart Rate	↑3–5%	↑10–15%	↑15–20%	During uterine contractions: ↑40–50%		Remains elevated at third trimester values	Return to pre-pregnancy values
Blood Pressure	↓10%	↓5%	↑5%	During uterine contractions: ↑SBP 15–25% ↑DBP 10–15%		↓SBP 5–10% within 48 hours; may increase again between days 3–6 due to fluid shifts	Return to pre-pregnancy values
Plasma Volume	↑	↑↑40–50%		↑	↑↑	↑↑↑500 mL due to autotransfusion	Return to pre-pregnancy values

Abbreviations: SBP, systolic blood pressure; DBP, diastolic blood pressure.

\*Hemodynamic changes that occur during pregnancy, labor, and postpartum (compared with prepregnancy) should be understood to identify early interventions (such as blood pressure control and diuresis) that may be needed to prevent clinical deterioration in a woman with cardiovascular disease.

Data from Kuhn JC, Falk RS, Langesaeter E. Haemodynamic changes during labour: continuous minimally invasive monitoring in 20 healthy parturients. *Int J Obstet Anesth* 2017;31:74–83; Ouzounian JG, Elkayam U. Physiologic changes during normal pregnancy and delivery. *Cardiol Clin* 2012;30:317–29; Sanghavi M, Rutherford JD. Cardiovascular physiology of pregnancy. *Circulation* 2014;130:1003–8; Shen M, Tan H, Zhou S, Smith GN, Walker MC, Wen SW. Trajectory of blood pressure change during pregnancy and the role of pre-gravid blood pressure: a functional data analysis approach. *Sci Rep* 2017;7:6227; Sohnchen N, Melzer K, Tejada BM, Jastrow-Meyer N, Othenin-Girard V, Irion O, et al. Maternal heart rate changes during labour. *Eur J Obstet Gynecol Reprod Biol* 2011;158:173–8; and Walters BN, Walters T. Hypertension in the puerperium [letter]. *Lancet* 1987;2:330.



## Myth # 2

# Exercise intensity at heart rate above 140 is dangerous in pregnancy



## Prescription for Aerobic Activity

**RATE OF PROGRESSION:** The best time to progress is during the second trimester since risks and discomforts of pregnancy are lowest at that time. Aerobic exercise should be increased gradually during the second trimester from a minimum of 15 minutes per session, 3 times per week (at the appropriate target heart rate or RPE to a maximum of approximately 30 minutes per session, 4 times per week (at the appropriate target heart rate or RPE).

**WARM-UP/COOL-DOWN:** Aerobic activity should be preceded by a brief (10-15 min.) warm-up and followed by a short (10-15 min.) cool-down. Low intensity calisthenics, stretching and relaxation exercises should be included in the warm-up/cool-down.

<b>F</b>	<b>I</b>	<b>T</b>	<b>T</b>
<b>FREQUENCY</b>	<b>INTENSITY</b>	<b>TIME</b>	<b>TYPE</b>
Begin at 3 times per week and progress to four times per week	Exercise within an appropriate RPE range and/or target heart rate zone	Attempt 15 minutes, even if it means reducing the intensity. Rest intervals may be helpful	Non weight-bearing or low-impact endurance exercise using large muscle groups (e.g., walking, stationary cycling, swimming, aquatic exercises, low impact aerobics)

**"TALK TEST"** - A final check to avoid overexertion is to use the "talk test". The exercise intensity is excessive if you cannot carry on a verbal conversation while exercising.

**PRESCRIPTION/MONITORING OF INTENSITY:** The best way to prescribe and monitor exercise is by combining the heart rate and rating of perceived exertion (RPE) methods.

### HEART RATE RANGES FOR PREGNANT WOMEN

MATERNAL AGE	FITNESS LEVEL or BMI	HEART RATE RANGE (beats/minute)
Less than 20	-	140-155
20-29	Low Active Fit BMI>25 kg m <sup>-2</sup>	129-144 135-150 145-160 102-124
30-39	Low Active Fit BMI>25 kg m <sup>-2</sup>	128-144 130-145 140-156 101-120

Target HR ranges were derived from peak exercise tests in medically prescreened low-risk women who were pregnant. (Mottola et al., 2006; Davenport et al., 2008).

### RATING OF PERCEIVED EXERTION (RPE)

Check the accuracy of your heart rate target zone by comparing it to the scale below. A range of about 12-14 (somewhat hard) is appropriate for most pregnant women.

- 6
- 7 Very, very light
- 8
- 9 Somewhat light
- 10
- 11 Fairly light
- 12
- 13 Somewhat hard
- 14
- 15 Hard
- 16
- 17 Very hard
- 18
- 19 Very, very hard
- 20

The original PARmed-X for PREGNANCY was developed by L.A. Wolfe, Ph.D., Queen's University and updated by Dr. M.F. Mottola, Ph.D., University of Western Ontario.

**No changes permitted. Translation and reproduction in its entirety is encouraged.**

Disponibile en français sous le titre «Examination médicale sur l'aptitude à l'activité physique pour les femmes enceintes (X-AAP pour les femmes enceintes)»

Additional copies of the PARmed-X for PREGNANCY, can be downloaded from

Canadian Society for Exercise Physiology  
[www.csep.ca/forms](http://www.csep.ca/forms)

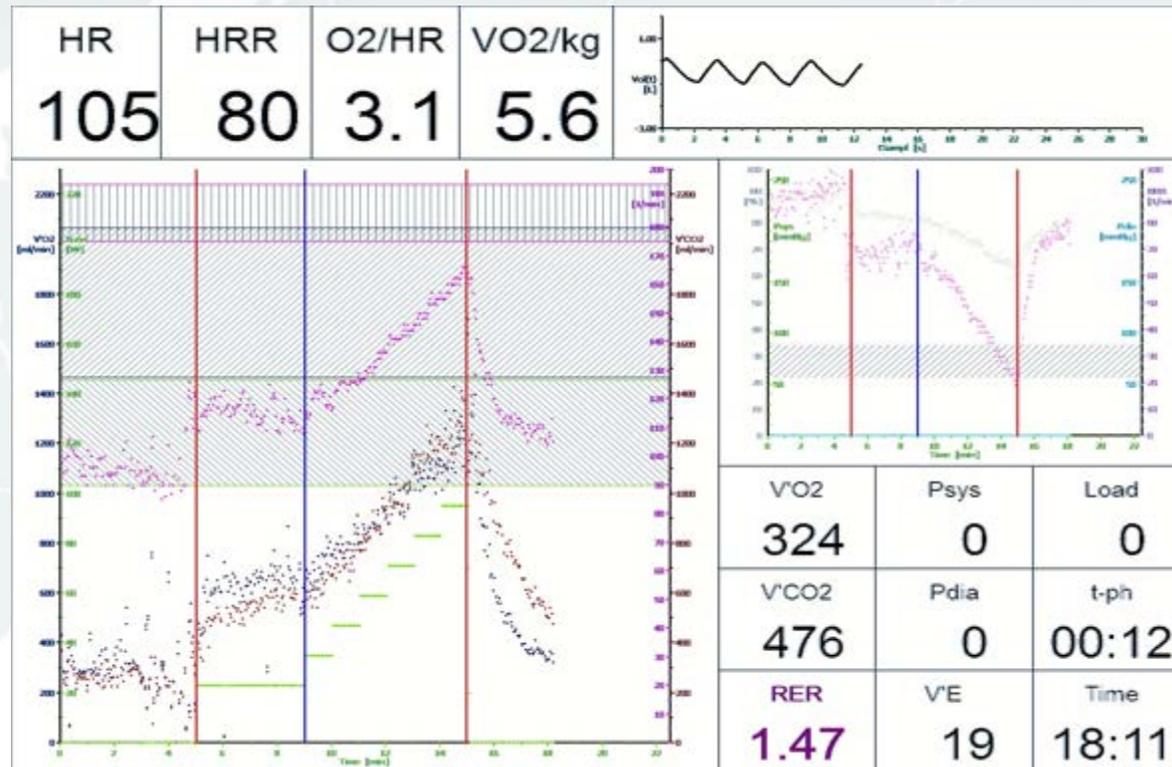


## Myth # 2

# Exercise intensity at heart rate above 140 is dangerous in pregnancy



An exercise progressive test up to refusal on a cycle ergometer with electronically regulated load (Viasprint 150P) and respiratory gas analyzer (Oxycon Pro, Erich JAEGER GmbH, Germany)



## Myth # 2

# Exercise intensity at heart rate above 140 is dangerous in pregnancy



Table 1. Characteristics of the study participants

Variable at baseline	All pregnant women n=97 (M ± SD)	Experimental group n=70 (M ± SD)	Control group n=27 (M ± SD)	P-value*
Age, y	30 ± 4	30 ± 4	29 ± 3	0.08
Gestational age, wk	21 ± 5	21 ± 5	19 ± 5	0.07
BMI, kg·m <sup>-2</sup>	23 ± 2.7	22.9 ± 2.8	23.5 ± 2.7	0.49
VO <sub>2 max</sub> , ml·kg <sup>-1</sup> ·min <sup>-1</sup>	23.3 ± 3.9	23.3 ± 4.0	23.4 ± 3.8	0.87
<b>HR zones for exercise sessions:</b>				
HR lower limit (b·min <sup>-1</sup> )	127 ± 12	126 ± 11	129 ± 12	0.25
HR upper limit (b·min <sup>-1</sup> )	149 ± 12	147 ± 11	152 ± 12	0.08

BMI – Body Mass Index; VO<sub>2 max</sub> – maximal oxygen capacity; HR – heart rate;

\*Mann-Whitney test; P ≤ 0.05 was considered statistically significant.



## Myth # 2

# Exercise intensity at heart rate above 140 is dangerous in pregnancy



Hindawi  
BioMed Research International  
Volume 2017, Article ID 9414525, 10 pages  
<https://doi.org/10.1155/2017/9414525>



### Research Article

## The Exercise-Induced Irisin Is Associated with Improved Levels of Glucose Homeostasis Markers in Pregnant Women Participating in 8-Week Prenatal Group Fitness Program: A Pilot Study

Anna Szumilewicz,<sup>1</sup> Aneta Worska,<sup>1</sup> Magdalena Piernicka,<sup>1</sup> Agnieszka Kuchta,<sup>2</sup> Jakub Kortas,<sup>3</sup> Zbigniew Jastrzębski,<sup>4</sup> Lukasz Radzimiński,<sup>4</sup> Joanna Jaworska,<sup>5</sup> Katarzyna Micielska,<sup>6</sup> and Ewa Ziemann<sup>5</sup>

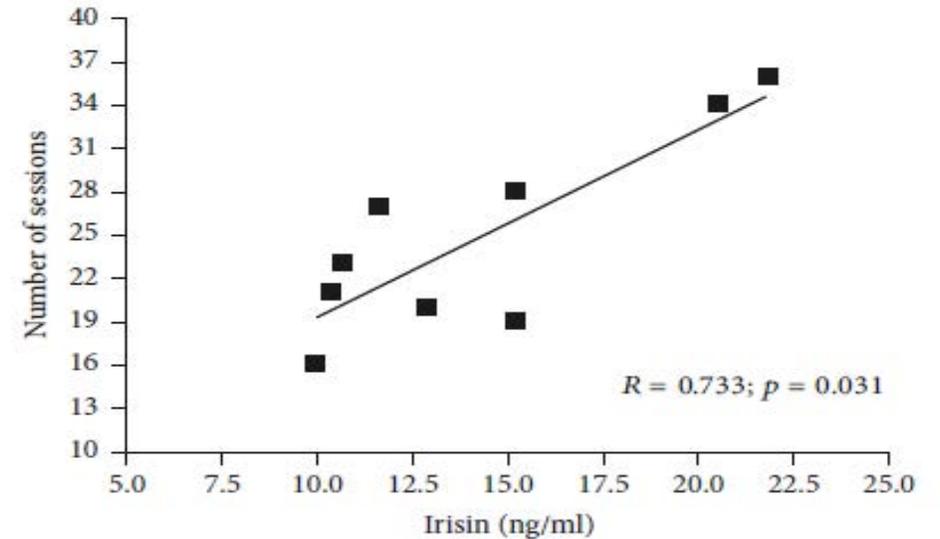


FIGURE 3: Correlations between irisin concentration and number of exercise sessions performed by pregnant women ( $n = 9$ ) during 8 weeks of exercise program.

Irisin is an exercise-inducible myokine that regulates the differentiation of adipose tissue, increasing the energy expenditure and reducing weight and insulin resistance



## Myth # 2

# Exercise intensity at heart rate above 140 is dangerous in pregnancy

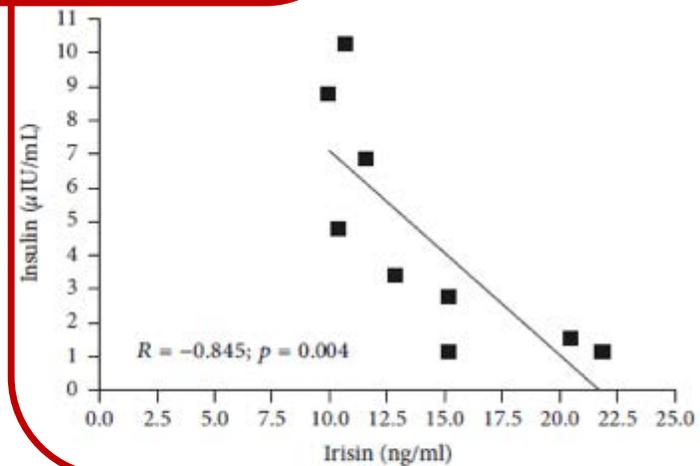
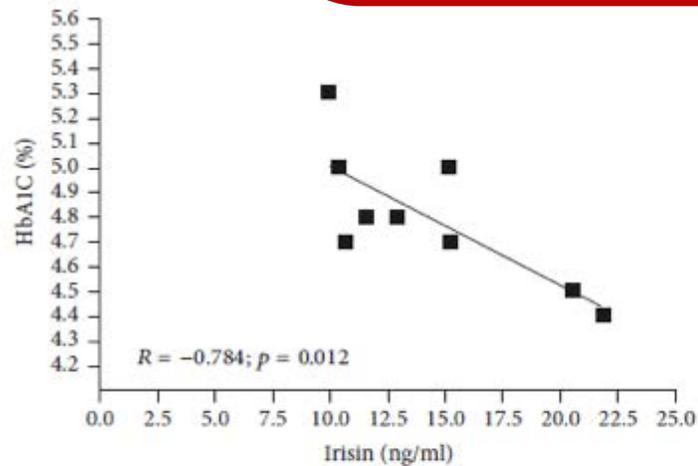
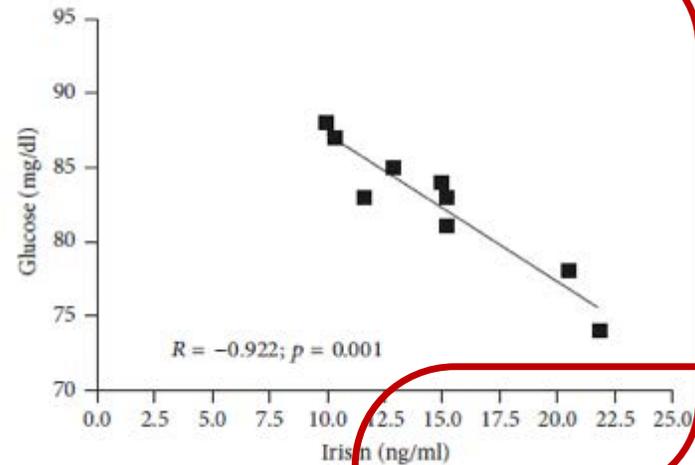


FIGURE 2: Correlations between irisin concentration and glucose homeostasis markers in women ( $n = 9$ ) in 29th week of gestation after 8 weeks of exercise program.

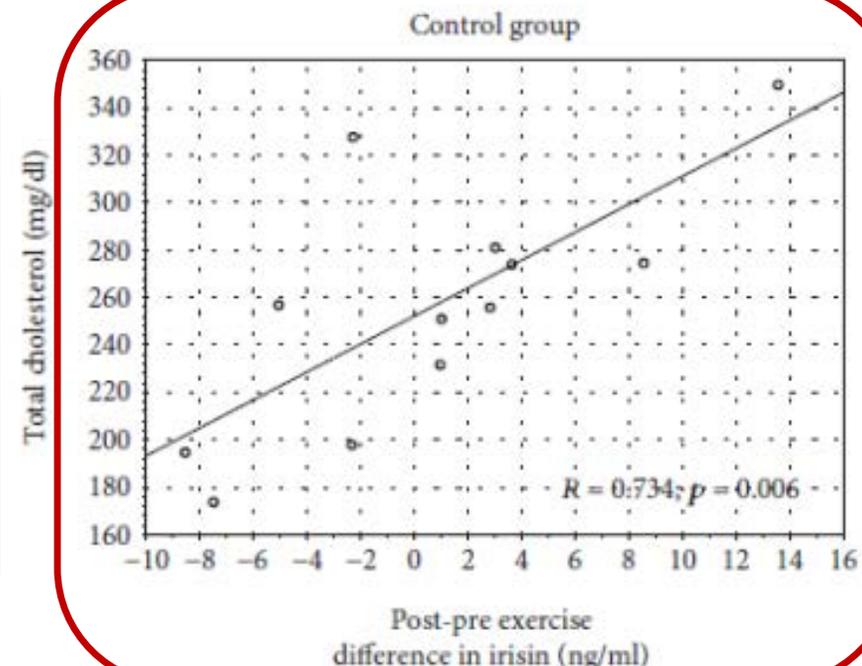
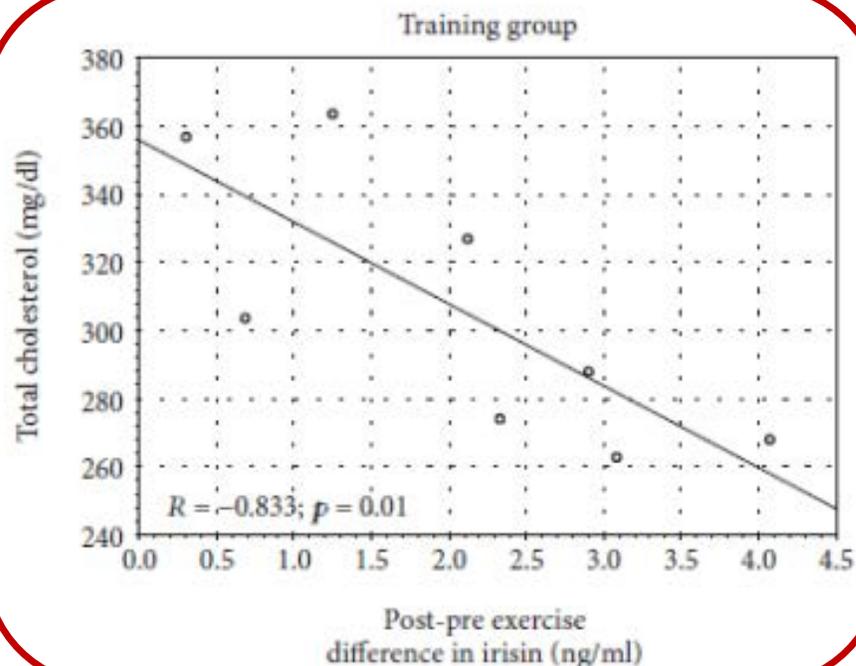


# Myth # 2

## Research Article

### Acute Postexercise Change in Circulating Irisin Is Related to More Favorable Lipid Profile in Pregnant Women Attending a Structured Exercise Program and to Less Favorable Lipid Profile in Controls: An Experimental Study with Two Groups

Anna Szumilewicz <sup>1</sup>, Aneta Worska,<sup>1</sup> Magdalena Piernicka,<sup>1</sup> Agnieszka Kuchta,<sup>2</sup> Zbigniew Jastrzębski,<sup>3</sup> Łukasz Radzimiński,<sup>3</sup> Marta Kozłowska,<sup>4</sup> Katarzyna Micielska,<sup>5</sup> and Ewa Ziemann<sup>4</sup>





Article

# Gestational Exercise and Maternal and Child Health: Effects until Delivery and at Post-Natal Follow-up

María Perales <sup>1,2</sup>, Pedro L. Valenzuela <sup>3</sup> , Ruben Barakat <sup>4</sup>, Yaiza Cordero <sup>5</sup> , Mireia Peláez <sup>6</sup> ,  
Carmen López <sup>7</sup>, Luis M. Ruilope <sup>8</sup>, Alejandro Santos-Lozano <sup>1,9</sup> and Alejandro Lucia <sup>1,10,\*</sup>

Perlaes et al., subjecting pregnant women to a moderate intensity exercise program, observed in the group of women inactive before pregnancy compared to the control group a significant reduction in the risk of pregnancy hypertension, gestational diabetes, fetal macrosomia as well as metabolic disorders and overweight or obesity in their children.

However, in the group of women active before pregnancy, these results were not statistically significant. This may indicate that the applied training stimulus was too weak for this group.



## Myth # 3



# *Runs or jumps can lead to pelvic floor disorders*

frontiers  
in Physiology

ORIGINAL RESEARCH  
published: 30 January 2019  
doi: 10.3389/fphys.2019.01907



### High-Low Impact Exercise Program Including Pelvic Floor Muscle Exercises Improves Pelvic Floor Muscle Function in Healthy Pregnant Women – A Randomized Control Trial

Anna Szumilewicz<sup>1\*</sup>, Marcin Domowski<sup>2</sup>, Magdalena Piernicka<sup>1</sup>, Aneta Worska<sup>1</sup>, Agnieszka Kuchta<sup>3</sup>, Jakub Kortas<sup>4</sup>, Monika Błudnicka<sup>5</sup>, Łukasz Radzimiński<sup>6</sup> and Zbigniew Jastrzębski<sup>6</sup>

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Clinical Trial/Experimental Study

Medicine<sup>®</sup>

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### Prenatal high-low impact exercise program supported by pelvic floor muscle education and training decreases the life impact of postnatal urinary incontinence

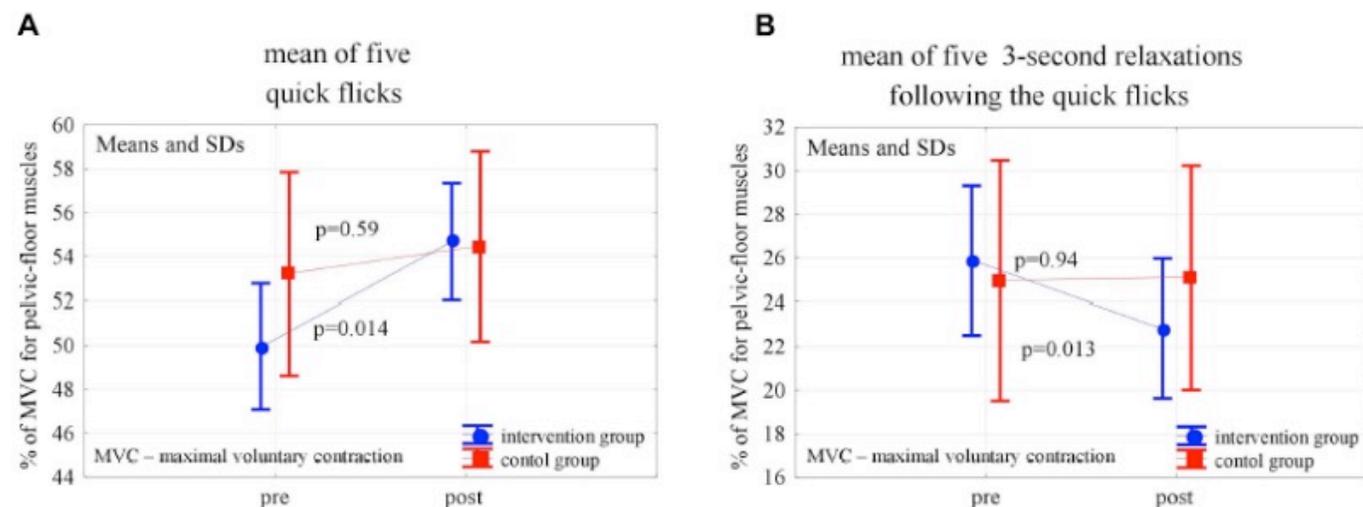
A quasiexperimental trial

Anna Szumilewicz, PhD<sup>1\*</sup>, Agnieszka Kuchta, PhD<sup>3</sup>, Monika Kranich, MSc<sup>8</sup>, Marcin Domowski, PhD<sup>2</sup>, Zbigniew Jastrzębski, PhD<sup>1</sup>



# Myth # 3

## Runs or jumps can lead to pelvic floor disorders



**FIGURE 2** | Changes in the mean EMG amplitude of pelvic-floor muscle quick flicks (A) and following relaxations (B) in the control and experimental groups after 6 weeks of high-impact exercise program.

Szumilewicz et al. 2019

## Myth # 3



# *Runs or jumps can lead to pelvic floor disorders*

„High-low impact exercise supported by pelvic floor muscle exercises and education should be promoted among pregnant, physically active women.

Such activities may help women to continue high intensity exercise with the simultaneous prevention or reduction of life impact of postnatal urinary incontinence.” (Szumilewicz et al. 2020)

Clinical Trial/Experimental Study

Medicine

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**Prenatal high-low impact exercise program supported by pelvic floor muscle education and training decreases the life impact of postnatal urinary incontinence**

A quasiexperimental trial

Anna Szumilewicz, PhD<sup>a,\*</sup>, Agnieszka Kuchta, PhD<sup>b</sup>, Monika Kranich, MSc<sup>c</sup>, Marcin Domowski, PhD<sup>d</sup>, Zbigniew Jastrzębski, PhD<sup>d</sup>



## Myth # 4



# *Physical activity in pregnancy can lead to miscarriage, premature labor or negative birth outcomes*

BJOG. 2017 Nov;124(12):1816-1826. doi: 10.1111/1471-0528.14672. Epub 2017 May 30.

### **Physical activity and the risk of preterm birth: a systematic review and meta-analysis of epidemiological studies.**

Aune D<sup>1,2,3</sup>, Schlesinger S<sup>2</sup>, Henriksen T<sup>4</sup>, Sauqstad OD<sup>5</sup>, Tonstad S<sup>6</sup>.

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- 5 Department of Pediatric Research, Rikshospitalet, Oslo University Hospital, University of Oslo, Oslo, Norway.
- 6 Department of Preventive Cardiology, Oslo University Hospital, University of Oslo, Oslo, Norway.

**Conclusion: Higher leisure-time activity is associated with reduced risk of preterm birth.**



## Myth # 4

Br J Sports Med. 2019 Jan;53(2):99-107. doi: 10.1136/bjsports-2018-099821. Epub 2018 Oct 18.



# Impact of prenatal exercise on maternal harms, labour and delivery outcomes: a systematic review and meta-analysis.

Davenport MH<sup>1</sup>, Ruchat SM<sup>2</sup>, Sobierajski F<sup>1</sup>, Poitras VJ<sup>3</sup>, Gray CE<sup>4</sup>, Yoo C<sup>1</sup>, Skow RJ<sup>1</sup>, Jaramillo Garcia A<sup>3</sup>, Barrowman N<sup>5</sup>, Meah VL<sup>6</sup>, Naqpal TS<sup>7</sup>, Riske L<sup>1</sup>, James M<sup>1</sup>, Nuspl M<sup>8</sup>, Weeks A<sup>9</sup>, Marchand AA<sup>10</sup>, Slater LG<sup>11</sup>, Adamo KB<sup>12</sup>, Davies GA<sup>13</sup>, Barakat R<sup>14</sup>, Mottola MF<sup>7</sup>.

**Results: 113 studies (n=52 858 women) were included.**

1. Prenatal exercise reduced the odds of instrumental delivery in the general obstetrical population.
2. There was no relationship between prenatal exercise and:
  - preterm/prelabour rupture of membranes
  - caesarean section
  - induction of labour
  - length of labour
  - vaginal tears
  - fatigue
  - injury
  - musculoskeletal trauma
  - maternal harms
  - diastasis recti.



## Myth # 5

*Women should not perform abdominal exercises*



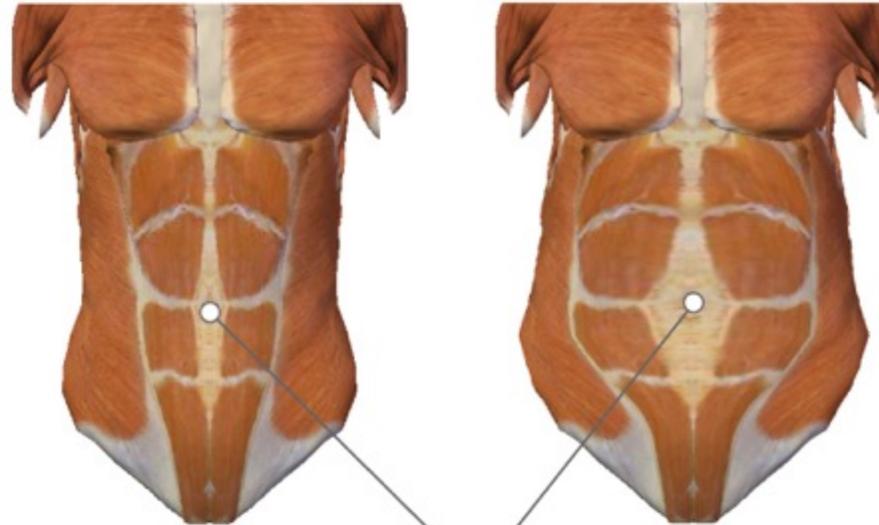
Strengthening abdominal and back muscles is recommended to minimize the risk of lower back pain (ACOG, 2020)

## Myth # 5

*Women should not perform abdominal exercises*



### Diastasis Recti



Separation of the Rectus Abdominis  
as the abdomen expands

source: visiblebody & core concepts

<http://www.coreconcepts.com.sg/mcr/pregnancy-changes-and-aches>



## Myth # 5

J Orthop Sports Phys Ther. 2015 Oct;45(10):781-8. doi: 10.2519/jospt.2015.5459. Epub 2015 Aug 24.



### The Immediate Effects on Inter-rectus Distance of Abdominal Crunch and Drawing-in Exercises During Pregnancy and the Postpartum Period.

Mota P<sup>1</sup>, Pascoal AG, Carita AI, Bø K.



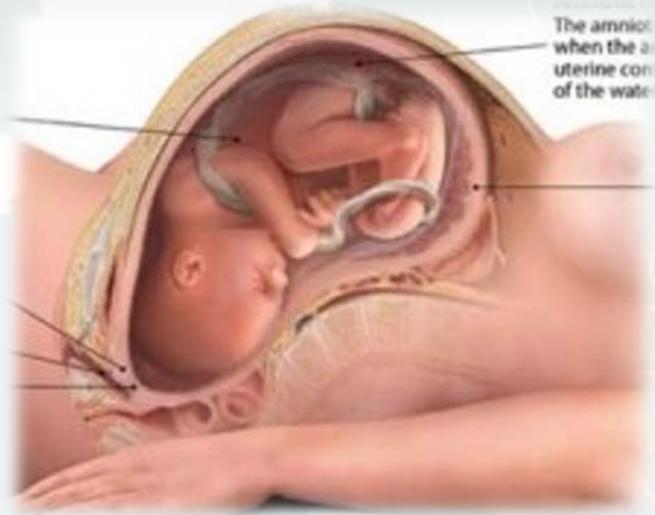
#### **Conclusion:**

There was a contrasting effect of the 2 exercises, with the abdominal crunch exercise consistently producing a significant narrowing of the inter-rectus distance (IRD).

In contrast, the drawing-in exercise generally led to a small widening of the IRD.

## Myth # 6

*Exercising in supine position  
is dangerous for the baby*



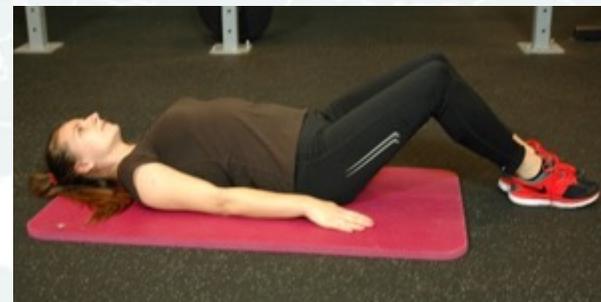
## Myth # 6

# *Exercising in supine position is dangerous for the baby*

## Review

### Is supine exercise associated with adverse maternal and fetal outcomes? A systematic review

Michelle F Mottola,<sup>1,2</sup> Taniya S Nagpal,<sup>1</sup> Roberta Bgeginski,<sup>3</sup> Margie H Davenport,<sup>4</sup> Veronica J Poitras,<sup>5</sup> Casey E Gray,<sup>6</sup> Gregory A Davies,<sup>7</sup> Kristi B Adamo,<sup>8</sup> Linda G Slater,<sup>9</sup> Nick Barrowman,<sup>6</sup> Ruben Barakat,<sup>10</sup> Stephanie-May Ruchat<sup>11</sup>



There is no evidence that maternal exercise in supine position is dangerous for the fetus.

...and many other unfounded ideas that pregnant women:

- can have joint injury because of performing flexibility exercises
- always have to reduce their training load significantly
- can't perform frequent changes in direction or any turns e.g. in aerobics classes
- can't raise their arms above their heads



## *The biggest mistake:*

*– an unwarranted recommendation for bed rest,  
a total prohibition or a strong limitation of exercise during pregnancy!*



„Activity restriction should not be prescribed routinely as a treatment to reduce preterm birth.” (ACOG, 2020)

# What's going on in Poland...?

56% doctors don't discuss the problem of physical activity

1% of doctors recommend physical activity to pregnant women

10% of doctors recommend the pregnant women to limit their physical activity without any medical reason

60% of pregnant women don't exercise because of the fear of their babies' health



Don't ask, don't tell.

Wojtyła A. et al.: *Epidemiological studies in Poland on effect of physical activity of pregnant women on the health of offspring and future generations – adaptation of the hypothesis Development Origin of Health and Diseases*. Ann Agric Environ Med. 2012; 19(2): 315-326.

Graph: Clapp J. F.: *Exercising through your pregnancy*. Addicus Books, Omaha, Nebraska, 2002.

# Exercise Professionals need education in the field of exercise in pregnancy

2016



SETTING THE STANDARDS  
FOR THE EUROPEAN  
HEALTH AND FITNESS SECTOR

## EuropeActive Standards EQF Level 5 Pregnancy and Postnatal Exercise Specialist



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Developmental Period Medicine, 2018;XXII,2

### EDITORIAL

*Anna Szumilewicz, PhD*

## WHO AND HOW SHOULD PRESCRIBE AND CONDUCT EXERCISE PROGRAMS FOR PREGNANT WOMEN? RECOMMENDATIONS BASED ON THE EUROPEAN EDUCATIONAL STANDARDS FOR PREGNANCY AND POSTNATAL EXERCISE SPECIALISTS

Department of Fitness and Strength Conditioning,  
Gdańsk University of Physical Education and Sport, Gdańsk, Poland

Our new approach...

We are working on a supplementary qualification:



2020



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**EuropeActive 'Exercise in Pregnancy'  
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MORE PEOPLE · MORE ACTIVE · MORE OFTEN

**Message to take home...**

**Exercise in pregnancy is the duty of every future mother to ensure her child develop properly.**



THANK YOU



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